

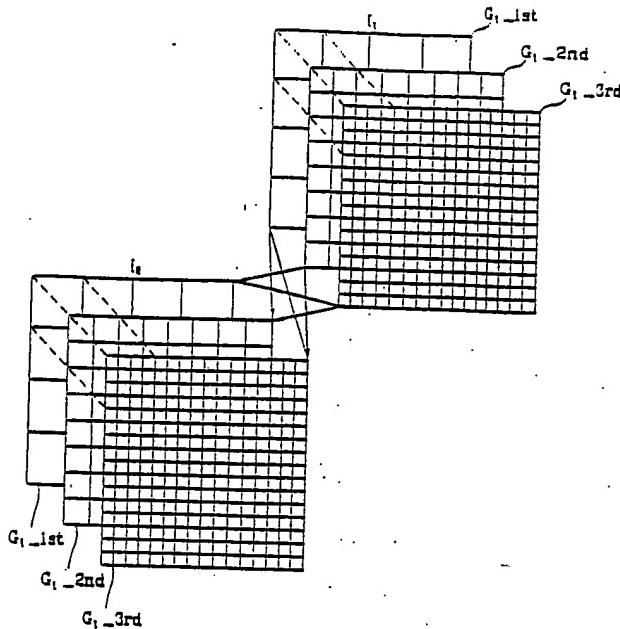
REMARKS

Claims 5-19 and 22-27 are pending. Claims 9-11 have been re-written into independent form to place them into condition for allowance, claims 5-7, 9-11, 14, and 22 have been amended, and claims 20 and 21 have been canceled. Applicant respectfully submits that the amendments presented in this paper raise no new issues requiring further searching or consideration by the Examiner, as the amendments involve either re-writing allowable dependent claims into independent form or amending independent claims to include one or more features recited in dependent claims which have already been examined. For at least these reasons, it is submitted that entry of this paper is proper.

Reconsideration of the application is respectfully requested for the following reasons.

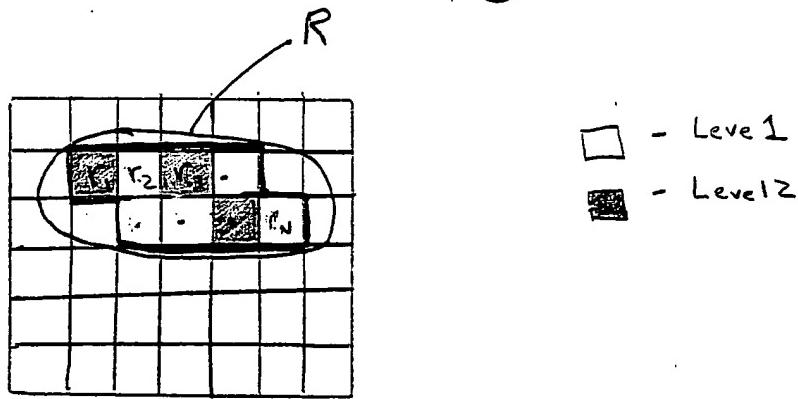
In the Final Office Action, the Examiner rejected claims 5-8 and 12-27 under 35 USC § 102(b) for being anticipated by the Vellaikal article. Applicant respectfully traverses this rejection for the following reasons.

Claim 5 recites broadly the embodiments of an image search method disclosed in the specification. This method includes determining color similarity between a reference image and a target image by "cross-matching grid levels of the reference image with grid levels of the target image." This cross-matching step is illustratively shown in Figure 4 (reproduced below) where each grid level of the reference image is compared to one or more different levels of the target image, e.g., level 1 of the reference image is compared to levels 2 and level 3 of the target image, level 2 of the reference image is compared to levels 1 and 3 of the target image, and so on.



The Vellaikal article does not disclose determining color similarity between a reference image and a target image by "cross-matching grid levels of the reference image with grid levels of the target image." Instead, Vellaikal is limited to matching only grid levels that are on a same level.

More specifically, Vellaikal first splits an image Q into different hierarchical levels. (See figure 1(a) on page 867, where this splitting procedure is referred to as quadtree-based splitting). Then, a region of interest R is specified. This region includes a plurality of nodes in the quadtree, where each node is included in a subregion r_i in region R. (See page 868, first column, first full paragraph which states $R \ni \{r_1, r_2, \dots, r_N\}$). The subregions in R may belong to different hierarchical levels of the quadtree structure shown in figure 1(a). The different hierarchical levels are designated by clear and shaded blocks in figure 1(b), which has been reproduced on the following page.



For illustrative purposes, in the above diagram the clear boxes correspond to level 1 of the quadtree structure and the shaded boxes correspond to level 2.

Once quadtree splitting of image Q is performed and a region R is selected, the similarity between image Q and another image T is determined. The similarity is determined based on the equation:

$$S_R(Q, T) = \sum_{i=1}^N w_i S_{r_i}(Q, T)$$

where w_i are weight values and S_{r_i} indicates the similarity at each subregion specified in region R.

From this equation, it is clear that the Vellaikal method determines similarity between the Q and T images within region R by adding up the similarities in each individual subregion r_i in region R.

It is further clear from this equation that the Vellaikal method does not cross-match grid levels of the reference image with grid levels of the target image as recited in claim 5. Instead, color similarity between two images is determined only by matching grid levels which are on the

same level in images Q and T. This is clear from the term $S_{r_i}(Q, T)$ in the above equation, where r_i represents each of the subregions in R.

As shown in figure 1(b), one subregion (e.g., r_1) may be shaded which means that the subregions in level 2 of both images Q and T are being compared. Another region may be clear (e.g., r_2) which means the subregions in level 1 of both images Q and T are being compared. Regardless of whether the subregion is shaded or not, the equation used by Vellaikal to determine the similarity between Q and T only matches grid levels that are on the same level in the images being compared. Put differently, Vellaikal does not match, for example, a quadtree node in level 2 with a quadtree node in level 1 and thus does not disclose the cross-matching step recited in claim 5. Otherwise, the shading in figure 1(b) would be different, e.g., such as .

Because the Vellaikal article does not disclose all the features recited in claim 5, it is respectfully submitted that the Vellaikal article cannot anticipate this claim. Applicant further submits that these differences are sufficient to render claim 5 and its dependent claims non-obvious and thus patentable over Vellaikal.

Concerning non-obviousness, while a claimed method does not have to demonstrate an advantage over a cited reference in order to be considered non-obvious (only a single difference not taught or suggested is required), the cross-matching step performed by the invention certainly gives claim 5 an advantage over Vellaikal, e.g., by comparing color grid levels on different hierarchical levels the claimed invention can determine similarity between images faster and with greater accuracy than the same-level approach taken by Vellaikal. For at least these additional reasons, it is respectfully submitted that claim 5 is allowable over the cited reference.

Claim 6 recites "determining similarity of reliability information indicative of accuracies of the region representative color values between the grid levels of the reference and target images." The Vellaikal article does not disclose these features. In the Final Office Action, the Examiner drew a comparison between the average color calculated based on the DC coefficients and the reliability information of the claimed invention. Applicant respectfully submits that this is an improper comparison.

In the invention defined in claim 6, two values are assigned to the grid levels in the reference and target images. The first value is a region representative color value and the second value is reliability information indicative of an accuracy of the region representative color value. To render claim 6 obvious, the Vellaikal article must disclose both types of information.

The types of information assigned by the Vellaikal article are disclosed in the second column of page 869, between lines 2-6:

F1 corresponds to the average color, F2 contains information only regarding the AC coefficients, F3 contains the average luminance in addition to the AC features while F4 is the most complete with information regarding the average color in addition to the AC features.

The average color of F1 is produced based on the DC coefficients noted by the Examiner. The F2 and F3 values indicate intensity and luminance information which are separately from the F1 value. And, F4 is a combination of the F1 average color and the F3 luminance information.

If the average color computed from the DC coefficients are taken to be the "second value" (e.g., the reliability information) as proposed by the Examiner, then Vellaikal would omit assigning the "first value" (e.g., a region representative color value) to the nodes in its quadtree

structure, simply because the average color is itself the only information that Vellaikal computes that is representative of color in those regions. None of the other F2, F3 and F4 values indicate a color value which is different from the average color of F1. (F4 just combines the F1 and F3 values).

On the other hand, if the F1 average color of Vellaikal is taken to be the "first value" (e.g., the region representative color value), then Vellaikal would omit assigning the "second value" (e.g., the reliability information) to the F1 average color value, i.e., none of the other values F2, F3, and F4 indicate a reliability of accuracy of the F1 average color value.

Either way, the Vellaikal would omit one of the two values recited in claim 6. Without a disclosure of both values, the Vellaikal article cannot anticipate claim 6. Applicant therefore submits that claim 6 is allowable over Vellaikal not only by virtue of its dependency from claim 5 but also based on the features separately recited therein.

Claim 14 is distinguishable on similar grounds, i.e., this claim recites that each of the cells in the first grid is assigned a first value and a second value for representing the spatial color feature of said image, and that the first value is a regional representative color and "the second value is a reliability score indicative of an accuracy of the regional representative color." The Vellaikal article fails to disclose at least this second value and therefore can neither anticipate nor render obvious the data structure defined in claim 14 and its dependent claims.

Reconsideration and withdrawal of all the rejections and objections made by the Examiner is hereby respectfully requested.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is respectfully requested.

Should the Examiner believe that further amendments are necessary to place the application in condition for allowance, or if the Examiner believes that a personal interview would be advantageous in order to more expeditiously resolve any remaining issues, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR § 1.136. Please charge any shortage in fees due in connection with this application, including extension of time fees, to Deposit Account No. 16-0607 (Attorney Docket No. P-082) and credit any excess fees to the same Deposit Account.

Respectfully submitted,



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